

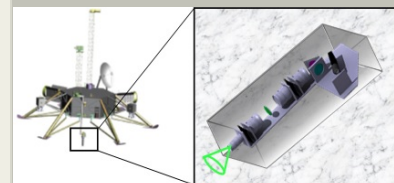
## In-Situ Spectroscopic Europa Explorer (ISEE), Phase I

Completed Technology Project (2016 - 2017)



## Project Introduction

The US congress has instructed NASA to include a lander component in the next Europa mission. The mission has a target launch date of 2022, and its primary goal will be to search Europa's icy surface for evidence of life that may persist within the ice shell or subsurface ocean. The Europa lander study specifically recommends a combination of a mass spectrometer and a Raman spectrometer to investigate Europa's habitability. Current flight prototypes, by design, existing planetary Raman instruments cannot detect organic compounds on Europa down to the required 1 ppb. We propose to build and critically test the in-situ Spectroscopic Europa Explorer (ISEE), a next-generation prototype of a compact, arm-mounted Raman Spectrometer. iSEE utilizes an innovative combination of light source, adaptive spatial coding optics, and detector. It integrates a high-performance signal processor and data processing algorithms that enable unprecedented measurements: in-situ chemical identification and quantitation of complex organic compounds, including pre-biotic compounds; biomolecules; minerals; and volatiles. iSEE also provides sample context, including ice composition, crystallinity, and ice phase distribution. Our project is responsive to 'T8.03 Detection technologies for extant or extinct life for use on robotic missions.' Our Phase I R&D will develop and integrate key subsystems of iSEE and evaluate its performance using standards and natural samples, particularly with respect to the detection of organic compounds and biomarkers. We will demonstrate the feasibility of iSEE to perform quantitative analysis of organic content, minerals, and volatiles at or < 1 ppb in solid matrices. The technical objectives of Phase I are: 1) Validate iSEE's optical path; 2) Build an iSEE breadboard system; 3) Determine performance parameters; 4) Demonstrate the capability to detect organic compounds and biomarkers in biologically lean natural samples.



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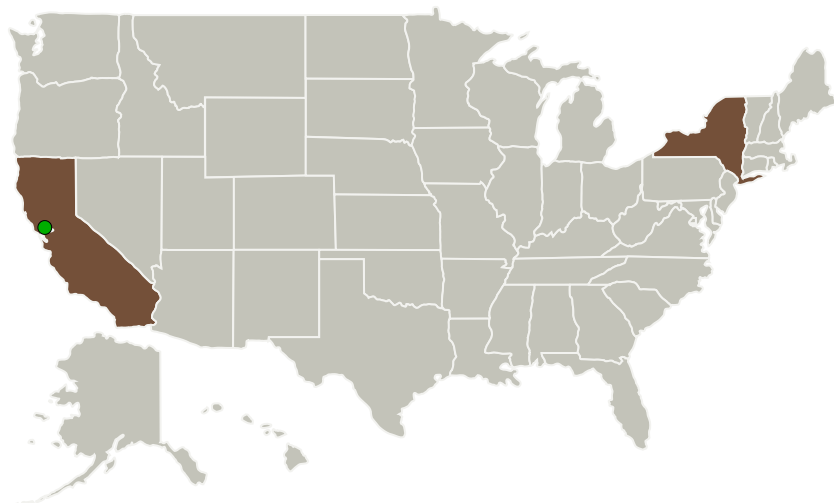
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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
SETI Institute(SETI)	Supporting Organization	Academia	Moffett Field, California

## Primary U.S. Work Locations

California	New York
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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Honeybee Robotics, Ltd.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

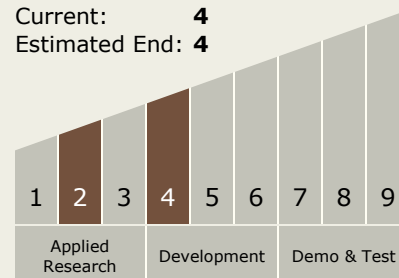
Carlos Torrez

**Principal Investigator:**

Pablo Sobron Sanchez

## Technology Maturity (TRL)

Start: 2  
 Current: 4  
 Estimated End: 4

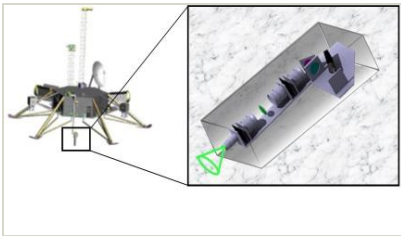


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## Images



### Briefing Chart Image

In-situ Spectroscopic Europa Explorer (ISEE), Phase I

(<https://techport.nasa.gov/image/130965>)

## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.3 Optical Components

## Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars